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Young Adolescent’s Confidence in Maternal Support:

Attentional Bias Moderates the Link Between Attachment-Related Expectations and Behavioral Problems

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Key words:

Attachment, Attentional Bias, Psychopathology, Early Adolescence.

Abstract

Attachment security is an important resilience factor for children at risk for psychopathology, whereas attachment insecurity can be an important risk factor. Effects of attachment security on behavior problems may be partially explained by expectations regarding attachment figures' availability and the moderating effect of concurrent automatic biases in children's attentional processing of their mother on the link between attachment-related expectations and behavioral problems. This hypothesis was tested in two studies with 10-12 year old early adolescents (Study 1: N = 32; Study 2: N = 138) . In both studies, the findings confirmed the moderation hypothesis, suggesting that less confidence in maternal support was related to more behavioral problems when children's attentional processing of mother was biased.

Keywords: Attachment, Attention, Behavior Problems, Cognitive Schema,
Developmental Psychopathology

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Ainsworth (e.g., 1973) conceptualized secure attachment in terms of children's *certainty* or confidence in a primary caregiver's availability, responsiveness, and ability to provide assistance, safety, and comfort. Just as confidence in a caregiver's availability and responsiveness is a valuable asset during development (e.g., Sroufe, Egeland, Carlson, & Collins, 2005), lack of confidence (*uncertainty*) plays a predictive (e.g., Allen et al., 2002) and moderating role (e.g., Pianta, Egeland, & Sroufe, 1990) in the development of children's behavioral problems. Although this association has been frequently demonstrated (e.g., Deklyen & Greenberg, 2008), the mechanisms remain poorly understood. A better understanding of the mechanisms at play could provide crucial insight to design improved treatment strategies.

Attachment security is a complex construct in which affective, cognitive, and behavioral components have each been considered pivotal. Although theoretically important, this complexity has made it difficult to study the precise mechanisms that link attachment status to behavioral problems. The current study focuses on one important component of the security construct: children's reported expectations regarding mother's availability and responsiveness (i.e., attachment-related expectations). Confidence in maternal support influences a child's likelihood of seeking support and safety when needed. Lack of confidence can have a negative impact on a child's interactive behavior. Expectations might influence behavioral problems if they co-occur with automatic or uncontrollable biases in the recall (e.g., Mogg, Matthews, & Weiman, 1987), the interpretation (e.g., MacLeod & Cohen, 1993), and the attentional encoding (e.g., MacLeod, Matthews, & Tata, 1986) of information related to these expectations. Applied to attachment, if a child expects a parent to be rejecting based on previous experiences, this will guide attention to new signs of rejections and lead to increased expectancy-congruent interpretive bias. In this way, both expectancies and information-processing biases develop throughout development. As expectancy-based information-processing bias could magnify the effect

of expectancies, the current study aims to investigate the moderating role of one type of information processing bias on the association between attachment-related expectations and behavioral problems: automatic attachment-related attentional bias.

Attachment and Children's Confidence in Maternal Support

Attachment theory emphasizes children's biologically driven need for parental support as a key condition for normative development. From birth onwards, stressors like hunger or fatigue automatically activate behaviors like crying, which elicit parental care (Bowlby, 1967). Sensitive parental responses such as soothing and comforting, help children to manage distress. This promotes survival and results in a sense of felt security (e.g., Sroufe & Waters, 1977). Recurrent experiences with sensitive parental responses lead to children's confidence that parents will provide support in response to future stressors as well. Instead, experiences with unresponsive parents lead to uncertainty regarding her responsiveness and support. Uncertainty limits support seeking behavior as it leads to fear of parental rejection (anxious attachment) and/or to the evaluation that it is better to solve ongoing issues without relying on the parent (avoidant attachment; Brenning, Soenens, Braet, & Bosmans, 2012; Mikulincer & Shaver, 2007).

Beyond infancy, when support seeking becomes less crucial for biological survival, confidence becomes critical for children's support seeking in response to psychological stressors like hurt pride, fear, and sadness (Mayseless, 2005). Children's ability to seek parental support appears to be especially important in middle childhood where lack of parental support and related uncertainty has a causal effect on children's behavioral problems (e.g., Doyle & Markiewicz, 2005; Brumariu & Kerns, 2010; Mezulis, Hyde, & Abramson, 2006). These middle childhood studies were surprising in light of attachment researchers' initial general consensus that attachment is less important in middle childhood (Kerns & Richardson, 2005). Instead, an increasing body of literature suggests that understanding attachment processes in this neglected age-period could be essential to understand the impact of uncertainty regarding parental support on maladjustment (Kerns, 2008). Given the impact of attachment on maladjustment in this age-group, it seems reasonable to assume that further middle

childhood attachment research might provide crucial information about the mechanisms at play in the association between attachment-related expectations and behavior problems.

Confidence in Maternal Support and Attentional Bias

Attentional biases modulate the ease with which individuals direct their attention towards relevant information (e.g., MacLeod et al., 1986) and can occur strategically or automatically. If strategic, individuals deliberately decide which information to attend to or to avoid. By contrast, automatic attentional biases occur outside of individuals strategic control. The latter biases occur early in the attentional encoding process, and act as a filter in processing a wide range of available information. As a result, expectation-congruent information gets processed and subsequently affects and guides behavior (Baert, Koster, & De Raedt, 2011).

Attachment-related expectations have always been assumed to be related to biases in the attentional processing of attachment-relevant information (e.g., Bowlby, 1973; Belsky, Spritz, & Crnic, 1996; Kirsh & Cassidy, 1997). Dykas and Cassidy (2011) extensively reviewed existing research. Although this review demonstrated that attachment is linked with attentional bias, (1) none of these studies investigated attentional biases in middle childhood, (2) most studies focused on the attentional processing of social (e.g., facial expressions or pictures and words reflecting care and rejection) or emotional information (e.g., positive and negative words) and less on idiosyncratic attachment information (i.e., stimuli related to the attachment figure) that should inform the decision to seek support, and (3) most studies focused on more strategic attachment-related attentional biases (e.g., orientation of gaze or eye-movements) and to a lesser extent on automatic biases. Given the current study's goal to investigate the interplay between self-reported attachment-related expectations and related automatic information processing biases to explain behavior problems, a different strategy to measure attachment-related attentional biases in middle childhood was needed.

A clear example of automatic attentional bias is the breadth of the attentional field around expectation-relevant stimuli presented centrally in the attentional focus. (Derryberry & Tucker, 1994). If stimuli presented centrally in the attentional focus are relevant in light of specific expectations,

attentional narrowing occurs (Kaplan, van Damme, & Lavine, 2012). Attentional narrowing refers to “tunnel vision” (Easterbrook, 1959) and means that expectations can reduce the ability to encode information that appears peripheral instead of central to the attentional focus. Research has indicated that attentional narrowing effects can occur slowly and transiently in relation to mood (for a review, see Gable & Harmon-Jones, 2010), but that attentional narrowing can also occur very rapidly in relation to specific stimuli (e.g., Bosmans, Braet, Koster, & De Raedt, 2009). In this study, we are specifically interested in this latter effect where attentional narrowing occurs at short presentation times (generally shorter than 90 ms, Ball, Beard, Roemker, Miller, & Griggs, 1988) making it hard to strategically control its outcome. It is noteworthy that the breadth of attention has a strong impact on the amount of information that is perceived in the environment and consequently on emotions and behavior (Eysenck, 1992). Therefore, investigating whether attentional narrowing could help specify the mechanisms involved in the association between attachment-related expectations and behavior problems.

Two previous studies found evidence suggesting that uncertainty in maternal support is linked to children’s attentional narrowing around their own mother in middle childhood. Although trait anxiety is an important predictor of the breadth of attention (Keogh & French, 1999), and although attachment and anxiety are strongly related (Brumariu & Kerns, 2010), the attachment-related narrowing effect was specific for attachment and could not be explained by children’s trait anxiety (Bosmans et al., 2009; Bosmans, Braet, Heylen, & De Raedt, 2012). Differences in the breadth of children’s attentional field around their mother reflected differences in children’s confidence in maternal support and not differences in anxious and/or avoidant attachment. This finding is in line with other research on other attachment-related attentional biases (e.g., Bosmans, De Raedt, & Braet, 2007; Maier, Bernier, Pekrun, Zimmermann, & Grossmann, 2004). This attentional narrowing effect may suggest that uncertain children are unable to stop seeking confirmation of their mother's availability and may predict that distressed children have a reduced tendency to seek support (Bosmans et al., 2012). As unsuccessful support seeking behavior negatively affects emotion regulation and the development of behavioral problems (Mezulis et al., 2006), the current study will investigate the

interplay between the attentional narrowing effect and children's self-reported confidence in maternal support to understand the link between attachment and behavioral problems.

The Present Studies

To formulate specific hypotheses about this interplay, the current study starts from theories proposing that behavioral outcomes can be explained by the interaction between strategic and automatic processes (Gawronski & Creighton, in press). Children's self-reported confidence in maternal support is a strategic process, while the attentional narrowing effect can be seen as an automatic process. These theories emphasize that behavior is most strongly influenced if strategic expectations are accompanied by related automatic biases. Therefore, we predicted that children with higher levels of behavioral problems are characterized by less confidence in maternal support and a more narrow attentional field around her.

Attachment theory suggests that a similar mechanism underlies the association between attachment and psychopathology independent of the content of the symptoms. The extent to which children are confident in mother's support and are able to use their caregivers' support has been related to eating pathology (Bosmans, Goossens, & Braet, 2009), depression (Brumbaru & Kerns, 2010), internalizing and externalizing symptoms (Cowan, Cohn, Cowan, & Pearson, 1996), ADHD (Erdman, 1998), behavioral problems (Greenberg, Speltz, & Deklyen, 1993), and autism (Rutgers, Bakermans-Kranenburg, van IJzendoorn, van Berckelaer-Onnes, 2004). Therefore, the current study investigated the effect of attachment-related expectations as a transdiagnostic risk feature of psychopathology.

Two studies were carried out to test this interaction hypothesis in early adolescents. Study 1 was designed to increase the likelihood of finding a significant interaction by composing a sample containing two specific subsamples: an inpatient clinical sample and a matched-control sample without behaviour problems (as reported by mother). This combined sample represents a broad variation in behaviour problems increasing the power of the interaction analysis. Study 2 was designed to test the same hypothesis in a general population sample.

In summary, the current study aimed to investigate the link between attachment-related expectations and psychopathology. We tested the hypothesis that the breadth of children's attentional field around their mother would moderate the link between attachment-related expectations and behavioral problems in two studies with 10-12 year old early adolescents: children uncertain regarding mother's support with a narrowed attentional field around her are expected to show more behavioral problems. Like in the previous studies on attachment-related attentional breadth, trait anxiety was used as a control variable (see Bosmans et al., 2007; 2009).

STUDY 1

Method

Participants

Clinical participants were 16 children, age 9 – 12 (14 boys and 2 girls), who resided in a child psychiatric hospital. In Flanders, children are only hospitalized in psychiatric clinics when the escalation of emotional and behaviour problems endanger the further development of the child to the extent that the symptoms are potentially dangerous for the child or its environment. Testing took place within the first four weeks after admission. To collect our sample, three different Flemish hospitals cooperated. Of this sample, all children met the criteria of at least one DSM-IV (APA, 2000) syndrome after multidisciplinary assessment: Autism Spectrum Disorder (44%), Conduct Disorder (13%), Adjustment Disorder (12%), Panic Disorder (6%), and ADHD (25%: 13% only met ADHD criteria, 12% met criteria for ADHD combined with Reactive Attachment Disorder). Mean duration of complaints before hospitalization was 144 months ($M = 30.2$; $SD = 41.83$). All children had their mother as primary attachment figure in the first three years of their life. Out of a larger general population sample who had participated in a recent attentional breadth study, 16 children were selected, individually matched on age, gender, and primary attachment figure in the first three years. None of these children had ever been in contact with mental health services.

Parental level of education in the combined sample showed that 12,1% of the mothers had an elementary school degree, 42.4% had a high school degree, 21.2% had a post-high school technical

training or a technical bachelor degree, and 18.2% had a university master degree. Furthermore, 9% of the fathers had an elementary school degree, 30.3% had a high school degree, 18.2% had a post-high school technical training or a technical bachelor degree, and 21.2% had a university master degree. Although the parents of the clinical group had a significantly lower level of education (for mothers: $F(1,29) = 4.41$, $p < .001$; for fathers: $F(1,29) = 15.81$, $p < .001$) this did not affect the analyses. 38.7% of the children had divorced parents. Number of divorced families was not different for both groups.

Measures

The Attentional Narrowing Effect was measured using the Attentional Breadth Task (ABT, Bosmans et al., 2009). Participants were seated in front of a 19'' CRT-computer screen, at a distance of exactly 27 cm from the screen using a chin rest to ensure accurate positioning and a computer mouse for answering. At each trial, in the center of the screen one picture appeared edited to 3 cm wide by 4 cm high. The pictures were divided into two categories: Ten different pictures of the mother were taken using a digital photo camera, focusing on the mother's face, and avoiding bright colors in the pictures. The mother was asked to show a neutral face, without showing her teeth to avoid salience effects. Next, 10 pictures were taken of 10 different women unfamiliar to the participants.

Simultaneously with the presentation of the central picture (see Figure 1), 16 gray dots with a diameter of 2 cm appeared at 4.5 cm from the central picture (close trials at 10° of the visual angle) and at 11.2 cm from the central picture (far trials at 25°) appeared during 34ms. The grey dots were arranged in pairs of two (one close and one far dot, situated on one of eight imperceptible axes that came together in the central point where the central picture was shown). Together with the dots, a smaller black circle (diameter of 1.3 cm) appeared either in one of the close or in one of the far dots. This black circle was the target stimulus that participants had to identify. After each trial a screen appeared with the question which picture they had seen (mother or unfamiliar woman). Correct responses on this question indicate whether the participants were looking at the center of the screen. Then a second screen appeared with the question on which of eight axes the target stimulus was located. Four categories of trials were presented: two picture types (mother versus unfamiliar women) combined with two distances (target stimulus presented close or far from the central picture). Each category contained 16

trials. The trials were presented in random order in two blocks of 64 trials each, separated by a short break. Children were instructed to look at the centre of the screen to identify the central picture and the target stimulus. After the trial was presented, children were first asked whether mother or an unfamiliar woman was presented. Secondly, children were asked where the target stimulus had appeared.

For all analyses, only the trials with correctly identified central pictures were used. This ensures that attention was focused to the middle of the screen. The proportion of correctly identified targets on trials with correctly identified pictures served as the main dependent variable. An Attentional Narrowing Index (ANI) was calculated by subtracting the proportion of correctly identified targets on the far trials from the proportion of correctly identified targets on the close trials. The ANI was calculated for mothers (ANImother) and unfamiliar women (ANIunfamiliar). Finally, the attentional narrowing effect (ANE) was calculated subtracting ANIunfamiliar from ANImother which expresses the extent to which the decrease in attentional breadth is stronger around mother compared to unfamiliar women. Higher ANE scores suggest a more narrow attentional field around mother reflecting less confidence in mother's support.

Attachment-related Expectations: Confidence in maternal support was estimated with the Trust-subscale of the People In My Life Questionnaire which is designed to measure 10 to 12-year-old children's representations of attachment figures (PIML, Ridenour, Greenberg, & Cook, 2006). This questionnaire is a child-friendly version of the Inventory of Parent and Peer Attachment (Armsden & Greenberg, 1985), which assesses Trust in the attachment figures' support, Communication about distress, and Alienation from the attachment figure (e.g., Allen, Porter, MacFarland, et al., 2007; Belsky, Jaffee, Hsieh, & Silva, 2001). This measure has been widely used, has good psychometric properties, and has shown good validity in adolescents (Allen, in press).

For the current study, only the items of the Trust-scale focusing on the relationship with mother were used. Trust is conceptualized as the positive affective/cognitive experiences of trust in the accessibility and responsiveness of attachment figures (10 items, e.g. "I can count on my mother to

help me when I have a problem”). Children responded on a 4-point Likert-scale ranging from 1 (almost never true) to 4 (almost always true). The Trust scale was previously linked with maternal parenting behaviors and the breadth of the attentional field around mother (Bosmans et al., 2009). The Trust scale was reliable in the current sample ($\alpha = .70$).

Symptoms of behavioral problems: The Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) lists child behavioral problems such as hitting family members or peers. Using a 3-point scale ranging from 0 (not true) to 2 (very true or often true), mothers were asked how often they had observed each behavior. The questionnaire consists of 113 items, which are summed into nine subscales: Anxious/Depressed, Withdrawn, and Somatic Complaints (the internalizing scales); Aggressive Behavior and Delinquent Behavior (the externalizing subscales); and Social Problems, Thought Problems, and Attention Problems. All these symptoms are then summed in a Total Problems (raw) score which represents the overall amount of psychopathology symptoms in the children. The CBCL has good discriminant validity (Achenbach & Rescorla, 2001). It can significantly distinguish between children with psychiatric disorders and non-disordered children (Novik, 1991).

Trait Anxiety was measured using the Trait Anxiety subscale of the State-Trait Anxiety Inventory for Children (Spielberger, Edwards, Lushene, Montuori & Platzek, 1973), translated into Dutch by Bakker, van Wieringen, van der Ploeg and Spielberger (1989), which was administered to the children. In the current sample we found a high reliability for Trait Anxiety ($\alpha = .91$).

Procedure

In the clinical sample, parents and children were informed and invited to the study by hospital staff when they met the study's inclusion criteria: children had to be between 10-12 years old and had to have an IQ above 85 (as measured by WISC-III in the clinic). Furthermore, children with acute psychotic symptoms and children who were considered too autistic to follow the instructions of the ABT were not invited to participate. The non-clinical sample was collected by an invitation published in a Flemish newspaper. Next, volunteering parents and children were informed about the content of the study and asked their approval to participate. All participating parents gave their informed consent.

All invited children chose to participate after being personally informed about the content and the methodology of the study and about their right to refuse participation. Prior to administration of the ABT, every child had a short conversation about their relationship with their mother. Following the theoretical assumptions of attachment interviews, talking with children about their mother should activate the attachment system (e.g., Target, Fonagy, & Shmueli-Goetz, 2003). Comparable strategies have already been used to activate the attachment system in previous attachment research on this age group (e.g., Bosmans et al., 2009), and in adult attachment research (e.g., Dewitte, Koster, De Houwer, & Buysse, 2007). While the child and the mother completed the questionnaires, the photos were integrated into the ABT. Afterwards, the children were presented with the ABT. All children were tested individually. The local ethics committee approved the study design.

Results and Discussion

In both samples, 3% of the ABT trials were removed after incorrect identification of the central picture. Table 1 displays descriptive information of the studied variables. None of the variables were related to gender. Groups did not differ on ANE, $F(1, 30) = .54$, *ns*, but the clinical sample scored significantly lower on Trust than the control group, $F(1, 30) = 5.64$, $p < .05$. The correlation between Trust and ANE did not reach significance in the entire sample, $r = -.18$; *ns*, but was significant in the clinical sample, $r = -.53$; $p < .05$, and non-significant in the control group, $r = .32$; *ns*. This pattern of results could have been affected by the restricted range in the Trust scores of the control group. In the entire sample, Trust and the CBCL Total Problems score were significantly correlated, $r = -.43$, $p < .05$.

The interaction between Trust and ANE was investigated using an Hierarchical Multiple Regression Analysis approach with centered predictors (HMRA, Aiken & West, 1991). As predicted (see Table 2), the interaction between Trust and ANE on the CBCL Total Problems score was significant, reflecting a medium effect size (Cohen, 1988). As depicted in Figure 2, less Trust combined with a stronger ANE was related to the highest CBCL Total Problems score. To identify at which values of ANE the slope of the regression between Trust and CBCL Total Problems score

becomes significant, the Johnson-Neyman procedure was used (e.g., Hayes & Matthes, 2009). Results show that the slope becomes significant at $ANE = .04$ with $b = -2.57$, $p < .05$, while the slopes at lower ANE values are all non-significant. Moreover, Table 2 shows that the effect of Trust on CBCL Total Problems score was no longer significant after taking into account the interaction effect. Adding Trait Anxiety to the analysis did not affect the Trust x ANE interaction ($\beta = -.49$, $p < .05$). To determine clinical significance of the model, odds ratio for correct identification of clinical (CBCL Total Problems T-score $> .63$) and non-clinical cases (CBCL Total Problems T-score $< .63$) was significant $OR = 9.33$, $\chi^2(3) = 8.89$, $p < .05$.

In line with the predictions, children displayed more behavior problems when they had a more narrow attentional field around mother and simultaneously reported to have less confidence in her support. The fact that the initial significant effect of self-reported confidence was reduced to non-significance suggests that this interaction effect could well reflect one of the processes explaining the association between attachment and behavior problems.

However, the small sample size of the current study can be considered problematic in terms of generalizability. Firstly, the two subsamples were small and represent extremes that are not representative for the general population. Secondly, the clinical and matched controls sample probably also differed with regard to other characteristics relevant for the variables under study. For example, this interaction effect could be influenced by being hospitalized or not (increasing the physical distance to mother and provoking homesickness), or by differences in IQ between clinical and non-clinical groups (e.g., Beitchman, Patterson, Gelfand, & Mindy, 1982). Therefore, we decided to reanalyze all general population ABT data collected to date (without the cases used in Study 1).

STUDY 2

Method

Participants

To date, another 138 general population children with ages ranging from 10-13 years (74 boys, 61 girls) have been tested with the ABT¹. 78% of the children lived together with both biological parents. All children had their mother as primary attachment figure during the first three years of their lives. Two children were adopted in the first months of their lives. Regarding parental level of education, 1.4% of the mothers had an elementary school degree, 24.8% had a high school degree, 42.3% had a post-high school technical training or a technical bachelor degree, and 31.4% had a university master degree. Furthermore, 5.6% of the fathers had an elementary school degree, 29.6% had a high school degree, 29.6% had a post-high school technical training or a technical bachelor degree, and 35.2% had a university master degree.

Materials

The Attentional Narrowing Effect was measured with the ABT. Trust in availability was measured with the Trust scale of the PIML that was administered to the children ($\alpha = .82$). Behavior Problems was measured using the Total Problems score of the CBCL administered to the mother ($\alpha = .88$). Trait Anxiety was measured using the Trait Anxiety subscale of the State-Trait Anxiety Inventory for Children ($\alpha = .87$). The procedure was similar to the procedure used in Study 1. Data were collected through an invitation distributed in elementary schools.

Results and Discussion

As for five children the CBCL scores were missing, data of 133 children were used for the interaction analysis. Gender was not related to the variables under study. Calculating the CBCL's Total Problem *T*-score allows to identify which children have clinically significant high scores. In this sample, 13.5% of the children got a *T*-score above the $T = 60$ threshold, which comes close to prevalence rates found in other Western European studies (e.g., Barkmann & Schulte-Markwort, 2005).

Bivariate correlation analysis demonstrated that the Attentional Narrowing Effect was significantly correlated with Trust. Also in this sample, Trust and the CBCL Total Problems score were significantly correlated (see Table 3). None of the variables were related to gender. The interaction between Trust and the Attentional Narrowing Effect significantly predicted CBCL Total Problems score, reflecting a small effect size (Cohen, 1988; Table 2). Although Trust was significantly correlated to the CBCL Total Problems score, the association was no longer significant after adding the interaction effect, $\beta = -.12$, *ns*. Figure 3 helps interpreting the meaning of the interaction effect. The slope of the regression between Trust and CBCL Total Problems score becomes significant at $ANE = .06$ with $b = -.79$, $p < .05$, while the slopes at lower ANE values are all non-significant.

Adding Trait Anxiety to the analysis did not affect the Trust x ANE interaction ($\beta = -.24$, $p < .05$), there was no effect of gender on this interaction (Gender x Trust x ANE interaction: $\beta = -.17$, *ns*), nor was the significance of the Trust x ANE interaction affected by adding gender as control variable ($\beta = -.22$, $p < .05$). To determine clinical significance of the model, odds ratio for correct identification of clinical (CBCL Total Problems T-score $> .63$) and non-clinical cases (CBCL Total Problems T-score $< .63$) was significant $OR = 9.58$, $\chi^2(3) = 8.07$, $p < .05$.

In line with Study 1, general population children displayed more behavior problems when they had a more narrow attentional field around mother and simultaneously reported to have less confidence in her support. Again, the initial effect of self-reported confidence on behavior problems was reduced to non-significance suggesting that this interaction effect could well reflect one of the processes explaining the association between attachment and behavior problems.

General Discussion

This study aimed to investigate the influence of attention bias on the link between attachment-related expectations and behavior problems. The present study suggested that the link between lack of confidence in maternal support and behavioral problems is moderated by the breadth of children's attentional field around mother. In two separate studies, the interaction between confidence in maternal availability and the attentional narrowing effect significantly predicted level of behavioral

problems. Specifically, children who are more uncertain about maternal support and at the same time have a more narrow attentional field around her have the most behavioral problems.

Although self-reported attachment was related to behavioral problems, confirming previous findings (e.g., Buist, Dekovic, Meeus, & van Aken, 2004), the current study suggests that this link is moderated by children's attentional processing of their mother. Where lack of confidence in maternal support was initially related to more behavioral problems, this effect was no longer significant when taking into account the interaction between confidence and the attentional narrowing effect. The current findings suggest that children have more behavioral problems when self-reported uncertainty regarding maternal support is accompanied by a more narrow attentional field around mother. These results were not affected by trait anxiety, nor by gender. This suggests that the processes revealed in the current study are specific for attachment and are the same for boys and girls.

Interestingly, these results also suggest that a decreased attentional field around mother is related to less behavior problems when children are confident in mother's support. This finding is in line with previous research showing that the same biased attentional processing of ambiguous stimuli can be adaptive or maladaptive depending on the motivational value of the stimulus (Bar-Haim, Holoshitz, Eldar et al., 2010). In both current studies, mother appeared to have a positive or a negative value depending on children's attachment-related expectations. This suggests that a strong attentional focus on mother when she is expected to be unavailable could reflect maladaptive rumination, while the same focus on a mother that is considered as available might guide children to seek her adaptive support more easily. This finding is important as it suggests a new perspective on attachment-related attentional biases. Instead of uniformly reflecting children's inability to rely on maternal support, the meaning of attachment-related attentional biases seems to be determined by children's relational context. The current findings seem to be in line with what is found in infant observation studies. For example, strong infant proximity seeking on reunion in the strange situation can mean security for some children, and insecurity in others (Ainsworth, Blehar, Waters, & Wall, 1978). Though more research is needed to determine the robustness of this phenomenon, it is promising that the same effect was found in two independent samples with different characteristics.

The current studies are the first to demonstrate the role of automatic attachment-related attentional processes in children's developmental outcomes. Thus far, these processes have been rather neglected in the literature. The fact that this effect was found in both studies, with different sample sizes and sample characteristics, suggests that this effect might be universal and not merely the result of coincidental sample characteristics. Nevertheless, the effect size in Study 1 was larger than the effect size in Study 2. This might be the result of our strategy in Study 1 to engineer a sample reflecting the extreme ends of the behavioral problems continuum. The power of interaction analyses is lower in randomly selected samples like the one used in Study 2 as the odds of having a sample of individuals that represent all four corners of the interaction effect are lower (Hayes & Matthes, 2009).

Some limitations of these studies should be noted. Firstly, the cross-sectional design did not allow us to investigate developmental mechanisms in the association between attachment and behavioral problems. Therefore, future research should investigate the role of these mechanisms from a developmental stance using longitudinal research designs. Nevertheless, the current study's multi-informant design prevented the effects from being inflated by reporter bias, and the multi-method design prevented the correlations from being inflated by shared method variance. This suggests that the study reflects a useful new strategy of looking at specific components of the security construct. Also, we merely tested one indirect effect whereas there are multiple expectancy-based information processing biases at the level of interpretation and memory that deserve to be studied as well. Future research is needed by other researchers using different methodologies to see whether this effect replicates. Moreover, future research should investigate whether the demonstrated interaction effect generalizes to other attachment-related processes, such as memory and interpretation biases, and to other mechanisms responsible for the development of behavior problems, such as rumination.

Finally, it is a disadvantage that only children's attentional processing of their mother and not of their father was taken into account in the prediction of behavior problems. While the automatic processes through which attachment-related attentional breadth is modulated are likely to be independent of the attachment figure's gender, the processes through which attachment influences the development of behavior problems might not be (e.g., Bögels & Phares, 2008; Bosmans, Goossens, &

Braet, 2009). However, previous research suggests that links between self-reported attachment to father and behavior problems only emerge after middle childhood, while links with self-reported attachment to mother already exist in middle childhood (Bosmans, Braet, Van Leeuwen, & Beyers, 2006). Consequently, it seems reasonable to assume that the breadth of the attentional focus around father might also be less related to behavior problems in the current study's age-group. Nevertheless, it is important that future studies use automatic processes (rather than self-report measures) to measure attachment to fathers before concluding that there is no link between attachment to fathers and behavior problems in middle childhood.

In summary, the current study suggests that children's lack of confidence in maternal support is mainly related to behavioral problems when children have a more narrow attentional field around mother. This interaction effect fully explained the initial association between confidence and behavioral problems. The findings suggest that the (attentional) information processing bias is an important component in the association between attachment-related expectations and psychopathology and might inform future research on why psychopathology is difficult to treat.

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Footnotes

¹ 40 children were part of Bosmans et al (2009) demonstrating a link between confidence and children's breadth of the attentional field around mother. 33 children were part of Bosmans et al. (under review) demonstrating a link between confidence and children's proximity seeking behavior. Data on the remaining 65 children have never been previously reported. Moreover, data of Study 1 was excluded from Study 2.

Table 1: Descriptive statistics

	Clinical				Match control				Group Differences	Total Sample			
	<i>M</i>	<i>SD</i>	Min	Max	<i>M</i>	<i>SD</i>	Min	Max	<i>t</i> (30)	<i>M</i>	<i>SD</i>	Min	Max
Trust	32.44	5.49	23	40	36.2	3.12	29	40	2.42*	34.31	4.79	23	40
CBCL Total	82.06	21.55	51	126	18.44	17.36	5	75	-9.15***	50.25	37.62	5	126
ANE	.01	.24	-.31	.56	.07	.20	-.26	.58	.81	.02	.22	-.31	.58

Note: CBCL Total = CBCL Total Problem score reported by mother; ANE = Attentional Narrowing Effect

* $p < .05$; *** $p < .001$

Table 2: Interactions between Trust and the Attentional Narrowing Effect on the CBCL Total Problems Score

Study 1						Study 2				
	$R^2\Delta$	$F\Delta$	Df	B	f^2	$R^2\Delta$	$F\Delta$	Df	β	f^2
<u>Step 1</u>	.18	3.27*	2,29			.05	2.95 [†]	2,125		
Trust				-.32 [†]	.11				-.12	.01
ANE				-.17	.03				.01	.00
<u>Step 2</u>	.15	6.28*	1,28			.04	5.66*	1,124		
Interaction				-.44*	.23				-.22*	.05

[†] $p < .10$; * $p < .05$

ANE = Attentional Narrowing Effect

Table 3: Correlations and Descriptive Statistics Study 2

	1.	2.	3.
1. Trust	1		
2. ANE	-.28**	1	
3. CBCL Total	-.27*	.06	1
<i>M</i>	36.17	.02	22.66
<i>SD</i>	3.68	.14	16.06
<i>Min</i>	20	-.32	0
<i>Max</i>	40	.50	96

Note: ANE = Attentional Narrowing Effect; CBCL Total = CBCL Total Problems score

** $p < .01$; * $p < .05$

Figure 1: Presentation of the ABT

Figure 2: Interaction between Trust and the Attentional Narrowing Effect on the CBCL Total Problem score in Study 1

Figure 3: Interaction between Trust and the Attentional Narrowing Effect on the CBCL Total Problem score in Study 2

Screen 1 (far trial)

Who did you see in the middle of the screen? Select "1" or "2"

Mother	Unfamiliar
1	2

Screen 2

 A diagram showing 16 gray circles arranged in a star-like pattern. Eight lines intersect at a central point, creating eight axes. Each axis has two circles, one on each side of the center. The axes are labeled with numbers 1 through 8 at their outer ends. Below the diagram is a row of numbers 1 through 8.

On which axis the circle appeared? Select the corresponding number.

Screen 3